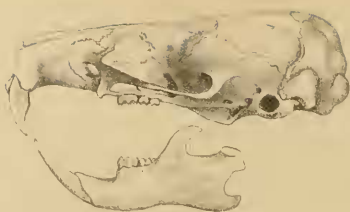




ICHTHYOMYS STOLZMANNI.

Mittem Bros. imp.

2.



1.



3.



4.



7.



5.



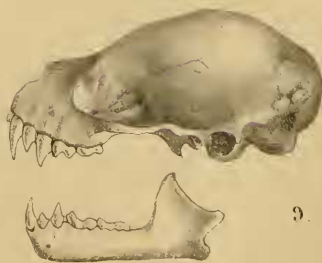
8.



6.



9.



10.



P. Smut del. et lith.

Mintern Bros. imp.

FIGS. 1-6. ICHTHYOMYS STOLZMANNI.
 " 7-9. ARTIBEUS GLAUCUS.
 " 10. NYCTINOMUS KALINOWSKII.

PLATE XXVII.

- Fig. 10. A transverse section through the rectum of *S. tessellatus*, to show the arrangement of the rectal tufts. On the left are scattered portions of the tufts surrounding and opening into the main duct, which is supported by two mesenteries. The section is cut obliquely, and on the right it passes beyond the tufts but through the duct, and the communication of the latter with the lacunar spaces in the wall of rectum is shown. The outlines of the skin and of the longitudinal muscles in section are shown above.
11. A transverse section through the œsophagus of *S. cumanensis*. Above the œsophagus is seen the dorsal blood-vessel with diverticula opening into it, other diverticula crowded with blood-corpuscles are shown in various planes. The retractor muscles are seen at the side.
12. A branch of the rectal tufts of *S. nudus*, highly magnified.
13. A section taken through the tentacular fold and brain of *S. nudus*. The ciliated coating of the fold and the numerous blood spaces in its walls are shown. Below, the latter open into the dorsal blood-vessel which bathes the ventral surface of the brain. The ciliated pit leading to the anterior surface of the brain, which is continuous with the epidermis, is shown, and also the digitate processes which project into the cœlom. The mouth and œsophagus lie to the left.

2. On some Mammals from Central Peru.

By OLDFIELD THOMAS.

[Received April 7, 1893.]

(Plates XXVIII & XXIX.)

I owe to the kindness of Dr. Jean Stolzmann, the Director of the Branicki Museum, Warsaw, the opportunity of working out a small collection of Mammals obtained in Central Peru by Mons. J. Kalinowski, which contains examples of several species either new or of such interest as to deserve a record.

The locality at which most of the specimens were obtained is Chanchamayo, near Tarma, approximately in lat. $11^{\circ} 20' S.$, and long. $75^{\circ} 40' E.$; in fact in very nearly the same region as the specimens collected by Mons. C. Jelski and described by me in 1884¹. The altitude of Chanchamayo is about 3000 feet.

The most remarkable of the species to be described is the interesting fish-eating Rat, *Ichthyomys stolzmanni*, which I have named in honour of the distinguished Polish ornithologist and collector, to whom I owe the pleasure of working out the specimens. There are also two new Bats.

Mons. Kalinowski is much to be congratulated on the excellent manner in which he has collected the specimens, the care he has devoted to the preservation of the skulls, and on the interesting discoveries he has made in a region evidently very far from worked out.

Thanks to the kindness of Dr. Stolzmann, the British Museum has been permitted to acquire, by way of exchange, the majority of the specimens now described.

¹ P. Z. S. 1884, p. 447.

1. *NYCTIPITHECUS TRIVIRGATUS*.

a, b. Ad. sks. ♂ ♀. Chanchamayo. 5/9/90.

2. *VESPERUS FUSCUS*, P. de Beauv.

a. Ad. al. ♂. Chanchamayo.

3. *SACCOPTERYX LEPTURA*, Schr.

a. ♂ al. Chanchamayo.

4. *SACCOPTERYX BILINEATA*, Temm.

a, b. 2 ♂ al. Chanchamayo.

As Dobson has remarked, these two species of *Saccolaryx* seem to be merely large and small races of a single form, exactly as in *Molossus rufus* and *M. obscurus*. The difference in size, however, is, in the one case as in the other, so great and so constant as to make it convenient to treat them all as distinct species so far as nomenclature is concerned.

5. *MOLOSSUS OBSCURUS*, Geoffr.

a-e. 5 in al. Central Peru.

6. *NYCTINOMUS KALINOWSKII*, sp. n. (Plate XXIX. fig. 10.)

Size very small, perhaps the smallest of the genus in the general bulk of the body. Lips slightly wrinkled. Ears not conjoined in front, but arising from the same point on the muzzle; their substance very thin and transparent; their inner margin evenly but faintly convex, without minute horny points; tip rounded off, but fairly defined, not lost in the general convexity, as is often the case; outer margin slightly convex for its upper, concave for its middle, and convex again for its lower third, but the curves are very slight and open, and there is practically no antitragus at all, the notch marking this lobe behind being almost obsolete; as a general result the line of the conch runs almost evenly from the tip to the insertion behind the angle of the mouth, a character, I believe, unique in the genus.

Keel of ear-conch very much reduced, and forming a mere narrow rim, barely a millimetre broad at its broadest point; its edge not thickened or bent round in any way. Tragus well developed, quadrangular, its upper nearly equal to its inner edge.

No trace of a gular sac, at least in the female.

Wing-membrane from the ankle. Fur very short and close, extending on the upper surface of the wing-membrane only as far outwards as a line drawn from the middle of the humerus to the middle of the femur; a few minute scattered hairs behind the forearm.

Colour pale fawn-grey, rather paler below than above; wing-membranes black, edged posteriorly with white. Membrane of ears whitish.

Teeth too much worn down in the type for proper description;

premolars only $\frac{1}{2}$, the anterior one above *perhaps* lost, and not really absent normally. Lower incisors 4.

Measurements of the type, an aged female in alcohol:—Forearm 34.5 mm. (= 1.35 in.); head and body 46; tail 28; head 18; ear from notch 14.5; both ears, tip to tip across head, 25.5; tragus 4; metacarpus of third finger 35, of fifth 22; lower leg 8; hind foot 7.

Hab. Central Peru.

This interesting little species differs widely from any of the previously known Neotropical *Nyctinomi*, and seems to approach some of the members of the group called *Mormopterus* by Peters, notably in the extreme reduction of the keel of the ear-conch, and in the absence of the upper anterior premolar; in fact, of all the known species, the Australian *N. norfolcensis*, Gray, appears to resemble it most nearly, although whether this resemblance really amounts to relationship, I am not at present prepared to say.

It is with great pleasure that I connect with this new Bat the name of its discoverer, M. Kalinowski, to whose labours we owe the valuable collection of small Mammals described in the present paper.

7. PHYLLOSTOMA HASTATUM, Pall.

a, b. 2 ad. al. ♂ ♀. Chanchamayo.

8. GLOSSOPHAGA SORICINA, Pall.

a-d. 4 in al. Central Peru.

9. ANURA GEOFFROYI, Gray.

Anoura geoffroyi, Gray, Mag. Zool. Bot. ii. p. 490 (1838) (excl. syn.).

Choronycteris peruana, Tschudi, Faun. Per., Mamm. p. 71 (1844).

Glossonycteris lasiopyga, Pet. MB. Ak. Berl. 1868, p. 365; Alston, Biol. Cent.-Am., Mamm. p. 45 (1879).

Glossonycteris geoffroyi, Dobs. Cat. Chir. B. M. p. 508 (1878).

a. Imm. al. Central Peru.

As the synonymy shows, Dobson and Alston have each thought it necessary to use a different name for this species, different both from each other and from that of the original describer, Gray. On reviewing the whole case, it appears to me that Dobson was right in considering the species named *geoffroyi* sufficiently characterized by the diagnosis given by Gray under the generic heading of "Anoura," *A. geoffroyi* being the only species. This being the case, it is also clear that *Anura* must be used for the genus, as the name had not been previously used in a generic sense in zoology. For both genus and species, therefore, I use the earliest name, verified as the identification is by the existence of Gray's type specimen.

The occurrence of this species in Peru confirms the reported identity of Tschudi's "*Choronycteris peruana*" with it.

10. *ARTIBEUS*¹ *GLAUCUS*, sp. n. (Plate XXIX. figs. 7-9.)a. ♀ al. Chanchamayo. *Type*.

Dentition as in the restricted subgenus *Artibeus*, of which the only known member is the large "*A. perspicillatus*," whether that is or is not subdivided into four or five local "species." Size as in the little *A. (Dermanura) cinereus*.

Anterior edge of nose-leaf free, its sides without extra lobes, its upright portion rather narrow and elongated. Ears rather short, their inner edge and tip broadly rounded, their outer edge with two slight concavities separated by a convexity. Wings to the end of the metatarsus. Interfemoral membrane emarginate to a point rather above the level of the middle of the tibia.

Fur above extending on to the proximal half of the foramen and base of antibrachial membrane, and there is a patch on the metatarsus of the thumb. The wings are covered as far as a line extending from the elbow to the knee, the interfemoral is thinly clothed on its basal half, and the legs are covered with fur right down to the claws. Below there is a sparse covering on the membrane near the body and on the base of the forearm, but the interfemoral membrane is almost naked.

Colour uniform cinereous grey, the lower surface scarcely lighter than the upper. Two faint whitish supraorbital streaks just distinguishable.

Skull in its general outline almost as elongated as that of *A. bilobatus*, and sharing with that species in the less abrupt rise of the brain-case above the level of the muzzle; but while in *A. bilobatus* it is the muzzle that is raised, in *A. glaucus* it is the brain-case which is depressed, so that there is no really close resemblance between the two. General palatal outline broader and shorter than in *A. bilobatus*, but not so much so as in *A. cinereus* and *quadrivittatus*.

Teeth. Upper inner incisors broad, vertical, spatulate, bicuspid, the inner cusps slightly longer than the outer. Outer incisors about half the height of the inner. Upper canines and premolars rather short and thick. No trace of \overline{m}^3 , although \overline{m}^2 has a slight and inconspicuous concavity in its posterior edge. Lower incisors equal, bicuspid; lower canine and posterior premolar attaining the same altitude; \overline{m}^2 of about the same horizontal length as \overline{m}^1 ; \overline{m}^3 rounded, minute, its size in cross section only about equal to that of one of the lower incisors.

Dimensions of the type, a slightly immature female² in spirit:—Forearm 43 mm.; head and body 51; ear from notch 15.5; nose-leaf, length 11.7, breadth of horizontal part 6.1, of upright part 4; length of thumb 9.3; tibia 15.2; foot 10; calcar 4.1; depth of interfemoral in centre 7.

¹ There appears to be no reason why this name should not be retained as originally formed by Leach, or why Agassiz's derivation of it from *ἀγρι* and *βάω* should be rejected; Winge's proposed amendment of it to *Artobius* ('Bats of Lagoa Santa—E Mus. Lundii,' p. 38, 1892) is therefore unnecessary.

² Teeth all up and in use, but epiphyses of limb-bones not fully united.

Skull—basal length 17; greatest length 20·8; zygomatic breadth 12; intertemporal breadth 5·6; palate, length 9·5, breadth outside $\overline{m^1}$ 8·6, inside $\overline{m^1}$ 4·4; front of canine to back of $\overline{m^2}$ 6·5; ditto in lower jaw 6·9; horizontal length of $\overline{m^1}$ 2·0, $\overline{m^2}$ 1·8, $\overline{m^3}$ 0·4.

There is no necessity for any comparison of this species with its allies, as its dental formula distinguishes it at once from all except the *A. perspicillatus* group, of which the smallest member is of at least three or four times its bulk.

A. glaucus is perhaps Tschudi's "*Phyllostoma pusillum*, Natt."¹, but has clearly nothing to do with Natterer's species, which was placed by Dobson in the genus *Chiroderma*, and later on transferred by myself to *Vampyrops*².

11. *SCIURUS VARIABILIS*, Geoff.

a. Ad. sk. ♂. Chanchamayo.

12. *SCIURUS CHRYSURUS*, Puch.

a. Ad. sk. ♂. La Gloria, Chanchamayo.

13. *RHITHRODON PICTUS*, Thos.

a. Ad. sk. San Blas, Cordilleras, 18000 feet. 30/4/90.

14. *ICHTHYOMYS STOLZMANNI*, g. & sp. nn. (Plate XXVIII. and Plate XXIX. figs. 1–6.)

ICHTHYOMYS, g. n.

Form modified for an aquatic piscivorous life.

Head markedly depressed, so as to give its side view a resemblance to that of a snake. Eyes and ears small. Whiskers long, stout, and prominent. Fur short and close. Hind feet (Plate XXIX. fig. 5) very broad; toes partially webbed, broadly and closely ciliated on each side; their soles, naked, with five broad low pads. Tail long, cylindrical, but increased in height vertically by having its under surface clothed with short elongated bristles.

Cæcum (fig. 6) much reduced in volume, very short, and only of the same diameter as the rectum. Small intestine of medium length; colon and rectum proportionally short.

Skull (figs. 1–4) curiously like that of *Hydromys*, its dorsal outline concave over the orbits, flattened and depressed throughout. Supra-orbital edges smoothly rounded, without any trace of ridges; supra-orbital foramina proportionally large, not within the orbit, but upon the top of the interorbital space. Infraorbital foramen exactly as in *Hydromys*, as broad below as above; anterior zygoma-root very short horizontally, its anterior edge vertical, not projecting forwards. Zygomatica extraordinarily weak, not properly ossified at the junction of the malar with the maxillary process. Palatine foramina of medium length.

Teeth. Incisors with their front surfaces so turned in towards

¹ Faun. Peruana, p. 63 (1844).

² Ann. Mag. N. H. (6) iv. p. 170 (1889).

each other that their faces form a **V** in horizontal section, and owing to this and to an apparently greater thickness of the enamel at their outer as compared to their inner margins, their cutting-edges also form a vertical reversed **A**, the outer corners projecting downwards as sharp divergent points, of obvious use in seizing fish. Molars somewhat of the *Habrothrix* type, but simpler, with high crowns, and opposite, not alternating, cusps, of which there are six in the first and four in the second molar both above and below, although the two most anterior below tend to fuse into one another. M³ above and below subtriangular, of average proportional size.

Type: *I. stolzmanni*, described below. "*Habrothrix*" *hydrobates*, Winge, should also be included in the genus.

This remarkable new genus is one of very great and special interest, on account of the fact that its members are modified, not merely for an aquatic life, as are many other rodents, but actually for a predacious piscivorous one, almost unique within the order. This fact is fortunately proved without question by the discovery, in the stomach of the Peruvian specimen now before me, of both scales and fish-bones, which have been identified by my colleague, Mr. Boulenger, as those of *Tetragonopterus alosa*, Günth., a fish with an average length of about six inches.

That the habits of *Ichthyomys* were in some way very peculiar might have been inferred from the striking modification of the upper incisors, of which the sharp separated points would apparently be almost useless for the gnawing phytophagous life of most rodents, whether aquatic or not, while the extreme degree of specialization in the swimming characters would result in an activity and speed under water fully capable of rivalling that of fishes or batrachians, and very different from that of ordinary water-rats. *Fiber*, however, and *Hydromys*, of Myomorph rodents, are also both about equally endowed with swimming-powers, and although both are primarily plant-eaters, yet the former certainly occasionally captures and eats slow-swimming fishes¹, and perhaps the latter also will prove to do so, especially as it has a tendency towards the peculiar double-pointed character of the upper incisors present in *Ichthyomys*, and also a very decided resemblance to it in the general shape and structure of the skull. At the same time neither of these forms has the peculiar physiognomy of *Ichthyomys*, whose general expression bears a considerable resemblance to that of such exclusively fish-eating mammals as *Lutra*, *Myogale*, and *Potamogetale*.

On the whole the balance of evidence appears to be in favour of *Ichthyomys* not being a plant-eater at all, but of its living entirely on fishes, batrachians, crustaceans, or other water animals.

Dr. Winge, in the description of his *Habrothrix hydrobates*, has entered into detailed comparisons of it with many water-mammals, but owing to his specimen having been a skin only, he was unable to make any investigation as to the character and contents of the intestines. But, nevertheless, his placing *I. hydrobates* in the

¹ See Merriam, Tr. L. Soc. New York, ii. p. 187 (1884).

genus or subgenus *Habrothrix* appears to me quite unaccountable, especially as he is one of the authors who consider that the majority of the different groups of what used to be called "*Hesperomys*" should rank as distinct genera. A short diagnosis of *Habrothrix*, based on the typical species, *H. longipilis*, is given in P. Z. S. 1884, p. 450, and it will be seen that *Ichthyomys stolzmanni* and *I. hydrobates* agree with that diagnosis in scarcely a single character of importance, even though it was not drawn up with the idea of any antithesis to such a specialized swimming form as the present.

The very noticeable resemblance in the structure of the anterior zygoma-root which *Ichthyomys* bears to *Hydromys* is a point well worthy of remark, for while this resemblance practically amounts to identity, yet there can be no suspicion that the two have a common origin, or can be other than a very remarkable case of parallelism. This case is the more remarkable as the structure of this region has been used by all the best authorities as a character of primary importance in dividing the Myomorph rodents into smaller groups, so that it will not be readily looked upon as one of little stability. Nevertheless, in the present instance we have two Murines, alike in their mode of life but derived from quite different ancestors, developing independently exactly similar infraorbital foramina¹. The presumed ancestor of each of the two highly specialized forms under consideration, *Xeromys* of *Hydromys*, and *Habrothrix* (or some ally) of *Ichthyomys*, both have typically murine infraorbital foramina.

ICHTHYOMYS STOLZMANNI, sp. n. (Plate XXVIII.)

Size and general proportions much as in the common Black Rat (*Mus rattus*). Whiskers long, strong, and numerous, silvery white with the exception of a few of the upper ones, which are brown. Ears very small and narrow, when laid forward they do not reach halfway towards the eye. Hands with the fingers quite free and unwebbed; pollex with a sort of elongated nail, not long enough to be called a claw; other digits with sharp curved claws; third and fourth fingers subequal, second reaching to the middle of the second phalanx of the third, fifth to the base of the same phalanx of the fourth; palm naked, with the usual five pads. Hind feet broad, fan-shaped; unwebbed part of toes broadly ciliated marginally; soles naked, with five large low rounded pads, the usual small postero-external pad absent. Tail about as long as the head and body, thick, cylindrical, its terminal half below with stiff elongate bristles. Palate-ridges 3—3. Mammary doubtful, owing to part of the abdominal wall having been cut away, but there is one pair just behind the axillæ, and another near the vulva;

¹ Dr. Winge (*l. c.* p. 22) ingeniously suggests, as the reason of the enlargement in the lower part of the foramen, the increased size of the nerve which supplies the prominent whisker-bristles. Although no doubt true so far as it goes, this explanation does not appear to me quite to cover the case, especially as *Fiber*, similar in habits and with nearly equal whisker development, has a highly typical Murine foramen.

Dr. Winge says of *I. hydrobates*, that there are "at least one pair on the breast, and two on the belly."

Fur short, close, and thick, very similar in texture to that of *Holochilus apicalis* or *squamipes*. General colour above mouse-grey, strongly grizzled with fulvous; upper half of ear-margin brown, lower white. Chin, chest, and belly dirty white, the hairs grey basally, dull white terminally. Upper surface of hands and feet pure white, except that the metacarpals are slightly tinged with brown; cilia of hind feet also pure white. Tail abruptly bicolor, brown above, and pure white below throughout its whole length.

Skull apparently quite as in *I. hydrobates* (see figures 1-4, Plate XXIX.), except that the anterior palatine foramina seem to run further back, ending exactly opposite the most anterior point of m.

Dimensions of the *type*, an adult female in alcohol:—

Head and body 146 mm.; tail 148; hind foot 36; ear, from notch 9.1, breadth 6.2; forearm and hand 33.5.

Skull—basal length 30.5; greatest length 34; greatest breadth 16; nasals, length 11, greatest breadth 4.2; intertemporal breadth 5; interparietal length 2.5, breadth 7.1; palate, length 17.3, breadth outside m^1 6.1, inside m^1 3.1; diastema 8.9; palatine foramina, length 6.5; length of upper molar series 4.4; basifacial length 19; basi-cranial length 11.5; lower jaw, condyle to incisor tips 22.

Hab. Chanchamayo.

This species differs from *I. hydrobates* in its rather larger size, its more elongated palatine foramina, and especially in its wholly bicolor tail, that member in the allied form being brown above and below, except just at the tip, which is whitish¹. *I. hydrobates* is a native of the Sierra de Merida, Venezuela, some thirteen or fourteen hundred miles north of the home of *I. stolzmanni*, but, speaking broadly, upon the same eastern slope of the great Andean chain.

I have great pleasure in connecting with this handsome animal the name of Dr. Jean Stolzmann, himself one of the best-known and most successful Peruvian collectors, the discoverer of many new Mammals², through whose kindness I am now enabled to describe the present interesting set of mammals.

15. *LAGIDIUM PALLIPES*, Benn.

a. Ad. sk. ♀. Incapirca, Zezioro, Junin. 8/5/90.

16. *DASYPROCTA VARIEGATA*, Tschudi.

a-c. Ad. ♀ and 2 yg. sk. Chanchamayo. 5/9/90.

17. *CAVIA CUTLERI*, Benn.

a. Ad. sk. ♀. Incapirca, Zezioro, Junin. 20/6/90.

¹ This coloration of the tail is again curiously suggestive of *Hydromys*.

² See P. Z. S. 1882, p. 98.